

Enhancing Luxury through  
Stained Glass, from Asia Minor to Italy  
*Francesca Dell'Acqua*

**T** HIS STUDY ADDRESSES the use of colored glazed windows in the interior decoration of Byzantine churches dating from the sixth to the twelfth century. In light of new evidence provided by recent excavations, I ask the question whether, or to what extent, developments in Byzantium can be associated with earlier or foreign architectural traditions. I attempt to demonstrate that there was an evolution in glassmaking techniques, and in the forms and ways glass was applied to architectural interiors.

## *Windows and Their Screens in Byzantine Architecture: Coherent with an "Architectural-Decorative System"?*

About thirty years ago, during a conference on medieval glass in the Balkans, Semavi Eyice, speaking about the lighting systems in Byzantine churches, stated that the more splendid monuments must have had glass windows, and proposed the following development: colored glass with lead comes (i.e., strips) in the West; painted glass disks set in marble or wooden window screens in Byzantium; and later, during the Ottoman period, tiny painted glass panels set in stucco screens.<sup>1</sup> Archaeological discoveries in the West and in the Byzantine East in the meantime have shown that the situation was, however, more complex; Byzantine craftsmen, for example, occasionally used leading, and also sometimes chose various other materials besides marble and wood to make the window screens. In light of those discoveries, a reassessment of the evidence is needed.

In a 1984 essay, Eutychia Kourkoutidou-Nikolaïdou presented a summary of the state of scholarship on Byzantine glass. Her own contribution concerned fragments of window glass found in two basilicas in Philippi that were renovated in Justinianic times.<sup>2</sup> She noted that a few scholars have studied the use of glass in the Byzantine world, particularly with regard to a disk found at San Vitale in Ravenna (see below, pp. 205–7 and fig. 1). However, the author concluded that interest in the subject has been sporadic and that this art-historical question has never been approached in a systematic way (i.e., by evaluating the material and textual evidence that has come down to us).

The use of glass in Byzantine architecture requires attention, now more than ever, not only because of the increasing number of archaeological finds from major sites of the Byzantine world, but also because we are equipped with a broader historical approach, developed by scholars of late antiquity and the early medieval West, an approach that has revealed the importance of the role played by glass window screens and by multicolored revetments in the complex arrangement of ecclesiastical decoration.<sup>3</sup>

1 "De la place de l'art de verrerie dans l'éclairage des intérieurs à Byzance," in *Verre médiéval aux Balkans (Ve–XVe s.): Recueil des travaux; Conférence internationale Belgrade, 22–24 avril 1974* (Belgrade, 1975), 123–25.

2 "Vitreaux paléochrétiens à Philippos," in *XXXI Corso di cultura sull'arte ravennate e bizantina (Ravenna, 7–14 Aprile 1984)* (Ravenna, 1984), 277–96, esp. 289.

3 F. Dell'Acqua, "Illuminando colorat": *La vetrata tra la tarda Antichità e l'alto Medioevo attraverso le fonti e l'archeologia*, Studi e Ricerche di Archeologia e Storia dell'Arte 4 (Spoleto, 2003).



**Fig. 1** Fragment of cylinder glass with Christ painted in grisaille. Ravenna, Museo Archeologico Nazionale, from San Vitale, 6th or 9th–10th century? (photo by author)

Window structure, although often underestimated by art historians, is of fundamental importance to the study of the fenestration and illumination of building interiors. Robert Ousterhout has recently reconsidered ecclesiastical decoration in all its aspects: from patronage to the structural conception, as well as the execution of its interior ornamentation. He stresses the importance of window glass in Byzantine buildings, even asserting that the form of windows must have been “dependent on glass technology.”<sup>4</sup> This statement reveals great sensitivity to the problems of architectural furnishing. If the glass medium influenced the shape of the windows, the form of their screens in turn affected the quality of the natural light that penetrated the interior. Likewise the shape and the number of the windows affected the appearance of the building’s exterior.<sup>5</sup>

Among the characteristics common to Byzantine churches in the centuries before and after the year 1000 are the support system for vaulting, the exuberant presence of figural mosaics, precious marble revetments, carved chancel screens, and narrow windows containing screens with circular perforations.<sup>6</sup> Such interiors required considerable illumination, natural or artificial, to maximize the effect of the luxurious furnishings.<sup>7</sup>

Byzantine wall structure never aimed at the “diaphanous” effects that occurred in western architecture during the Gothic age, when architects sought to transform walls into large window screens of stained glass.<sup>8</sup> By contrast, in Middle Byzantine buildings colored glass windows were unusual. To account for their scarcity, it is necessary to consider the types of windows in their contexts, including that of the technology available over the long history of the Byzantine Empire.<sup>9</sup> Moreover, windows and their protective screens are part of an architectonic “system,” dependent upon precise structural requirements, functional as well as aesthetic.<sup>10</sup> Stimulated by several observations made by

4 R. G. Ousterhout, *Master Builders of Byzantium* (Princeton, N.J., 1999), 151 and 156. Useful comments on the location of windows and lamps, based on the awareness of natural and artificial light sources, were found in L. Theis, “Lampen, Leuchten, Licht,” in *Byzanz—Das Licht aus dem Osten: Kult und Alltag im Byzantinischen Reich vom 4. bis 15. Jahrhundert*, ed. C. Stiegemann (Mainz am Rhein, 2001), 54–64.

5 In an earlier study on the Kariye Camii, Ousterhout noted how the window screens were set deep into the window embrasures, in the part closest to the interior, thereby accentuating the plastic effects on the building exterior; see R. G. Ousterhout, *The Architecture of the Kariye Camii in Istanbul*, DOS 25 (Washington D.C., 1987), 89.

6 Regarding the stucco screens with glass disks found in the Church of the Dormition in Gračanica, see S. Čurčić, *Gračanica: King Milutin’s Church and Its Place in Late Byzantine Architecture* (University Park, Pa., 1979), 121. He notes that these reflect the “standard designs of the period,” acknowledging the predominance of this type in Middle Byzantine architecture. For a useful map of the Balkans illustrating the sites where blown glass disks for windows (crown glass) have been found, see V. Han, “The Origin and Style of Medieval Glass Found in the Central Balkans,” *JGS* 17 (1975): 114–26.

7 The main Byzantine churches built after the 8th century did not have large glazed windows, but obviously had devices for artificial lighting. I have profited from conversations on this topic with Dr. Lioba Theis, who is currently engaged in an exhaustive analysis of natural and artificial lighting devices in Byzantine churches.

8 A. Peroni (“Il Duomo di Trento e il mito moderno della cattedrale,” in *Il Duomo di Trento*, vol. 1, *Architettura e scultura*, ed. E. Castelnovo and A. Peroni [Trento, 1992], 34–53, esp. 42–43) has emphasized the cultural significance of the appearance and recurrence of the concept of transparency in Gothic architecture (“diaphane Struktur”) on the part of German art historians between the two world wars. His source was Hans Jantzen (*Über den gotischen Kirchenraum, und andere Aufsätze*, 2nd ed. [Berlin, 1951]). Jantzen used the term *diaphane* to emphasize not the intrinsic architectural orchestration but rather the spiritual potential of the mystic space of the Gothic cathedral, a virtual non-space that could be experienced only through the emotions; for him the stained-glass windows were a colored wall. Hans Sedlmayr, on the other hand, considered stained glass windows as a muraled jewel; see his *Die Entstehung der Kathedrale* (Zurich, 1950).

9 See Ousterhout, *Master Builders*, 156 (n. 4 above).

10 Eugène-Emmanuel Viollet-le-Duc made a special point of studying fenestration, as well as stained glass windows, as objects in their own right, apart from the structures with which they were associated. He compared his methodology to writing a treatise on the natural history of animals, presenting only a collection of ears without the head to which they belonged (“Fenêtre,” in *Dictionnaire raisonné de l’architecture française du XIe au XVIe siècle* [Paris, 1854–68; repr., 1967], 5:365–419, esp. 370).

Ernst Kitzinger and Slobodan Ćurčić, I consider here the idea of an architectonic-decorative “system,” trying to avoid the temptation to schematize a situation that changed both over time and according to geography.<sup>11</sup>

Only in three cases—San Vitale, the Pantokrator (Zeyrek Camii), and the Chora (Kariye Camii)—do we have proof of the introduction of figurative windows in Byzantine ecclesiastical architecture. Through the years the origin of these windows has been debated by the supporters of Byzantine primacy in the arts, who favor a Byzantine origin for stained glass, and those who firmly assert that stained glass is alien to the Byzantine tradition.

Stained glass windows were clearly more common in the West, where single figures or entire narratives were assembled by expert master glaziers from colored glass panels, subsequently painted, and united by lead strips called lead comes. Yet the historical circumstances behind each of the several Byzantine instances of figurative stained glass are extraordinary (see below, pp. 205–10). It may be that in general Byzantine planners and patrons, even if they were aware of Western stained glass windows, were not able to replicate them, perhaps because of the lack of the necessary glass technology in the East. Another possible explanation is that they did not want stained glass windows, even if they could have had them, because glass painted with figures would have altered the equilibrium between light and dark, and also between ornamental and figurative arrangements. Whereas figurative stained glass was intensely colored, the glass disks in Byzantine windows were, with rare exceptions, pale in tone, and therefore their coloring would not have “interfered” with that of the mosaics. Furthermore, figural stained glass windows could have “competed” with the figural wall mosaics, which were designed traditionally for the representation of scenes and images. So perhaps the Byzantines did not favor windows with representations of figures, landscapes, or emblems because these could detract from the “reading” of the iconographic cycles developed in mosaic, an artistic medium that they highly appreciated.<sup>12</sup>

### *Window Screens in Byzantium from the Sixth to the Eleventh Centuries*

One of the most important buildings erected in Constantinople during the sixth century, the church of St. Polyeuktos, built by the noblewoman Anicia Juliana, had large marble screens in the windows with rectangular openings for glass, as shown by the archaeological excavations.<sup>13</sup> The sculpture, the marble and mother-of-pearl revetments, the columns encrusted by glass *sectile* work, the mosaics, the marble window screens enclosed with large glass panels, and

13 Anicia Juliana was related to the Theodosian imperial family, the granddaughter of Valentinian III (the son of Galla Placidia) and Licinia Eudoxia. She was an active patron of the arts; see E. Kitzinger, “Artistic Patronage in Early Byzantium,” in *Committenti e produzione artistico-letteraria nell’alto Medioevo occidentale: Settimane di Studio del Centro Italiano di Studi sull’Alto Medioevo, XXXIX, 4–10 aprile 1991* (Spoleto, 1992), 1:33–55, esp. 44–45 and 55. J. P. Thomas (*Private Religious*

*Foundations in the Byzantine Empire*, DOS 24 [Washington, D.C., 1987], 23–24) has stressed Anicia’s considerable financial outlay, based entirely on her private resources, since the Theodosian family was no longer in power.

11 Both scholars resorted to the concept of a “system” in which specific structural elements and ornamental ensembles converge, while others do not. The purpose was to demonstrate the affinities and differences between the eclectic monuments of Norman Sicily and the contemporary art and architecture of Byzantium. See E. Kitzinger, “Art in Norman Sicily: Report on the Dumbarton Oaks Symposium of 1981,” *DOP* 37 (1983): 167–70, esp. 169; idem, “Mosaic Decoration in Sicily under Roger II and the Classical Byzantine System of Church Decoration,” in *Italian Church Decoration of the Middle Ages and Early Renaissance: Functions, Forms and Regional Traditions; Ten Contributions to a Colloquium Held at the Villa Spelman, Florence*, ed. W. Tronzo, Villa Spelman Colloquia 1 (Bologna, 1989), 147–65; S. Ćurčić, in E. Kitzinger, *The Mosaics of St. Mary’s of the Admiral in Palermo, with a Chapter on the Architecture of the Church by Slobodan Ćurčić*, DOS 27 (Washington, D.C., 1990), 31–34 and 66–67.

My concept of an architectonic-decorative “system,” in which the glass window has a precise functional and aesthetic role, grew out of conversations with Beat Brenk. It emerges from tracing evidence for the use of glass in western architecture of late antiquity and the Middle Ages on the basis of texts as well as of the monuments themselves (see Dell’Acqua, “*Illuminando colorat*,” 161 ff. [n. 3 above]).

12 The attention paid in Byzantium to mosaics is attested by contemporary literature on the development of light aesthetics, which acknowledges that their appreciation depends on the type of illumination used, since generally mosaics are regarded in terms of their splendor. Not only the selection of colors but the very angle of placement of tesserae and other refined adjustments were designed to achieve the maximum reflective effect in mosaic revetments. See L. James, “What Colours were Byzantine Mosaics?” in *Medieval Mosaics: Light, Color, Materials*, ed. E. Borsook, F. Gioffredi Superbi, and G. Pagliarulo, Villa I Tatti—The Harvard University Center for Italian Renaissance Studies 17 (Milan, 2000), 35–46, esp. 42–43; for a few of the relevant texts see E. Borsook, “Rhetoric or Reality: Mosaics as Expressions of a Metaphysical Idea,” in *FlorMitt* 44.1 (2000): 2–18.

all the other details testify to the wealth and power of the patroness.<sup>14</sup> An indication of the grandeur of St. Polyeuktos's interior is the size of the windows. These had marble screens almost 1 m wide and approximately 2.5 m high. The grilles featured semicircular tops and contained rectangular and semicircular glass panels set in nine rows. This flat glass was blown with the cylinder method, and was both clear and variously colored, in tones of dark brown, blue, olive green, and aquamarine.<sup>15</sup> A similar screen, but of smaller size, has been found on the site of the former monastery of Constantine Lips and has been thought to be earlier than the surviving early tenth-century church (fig. 2).<sup>16</sup> The imperial splendor that distinguished the "temple" of St. Polyeuktos was claimed in contemporary texts to have surpassed that of Solomon.<sup>17</sup> It must have provoked Justinian, who was not of noble birth, to diminish the splendor of St. Polyeuktos by creating something even grander in the form of the church dedicated to Hagia Sophia.<sup>18</sup>

16 T. Macridy et al., "The Monastery of Lips (Fenari Isa Camii) at Istanbul," *DOP* 18 (1964): fig. 58. Ousterhout, *Master Builders*, 152 (n. 4 above). Numerous carved reliefs from St. Polyeuktos removed during its period of decline were later reused as spolia in Constantinople (e.g., in the Pantokrator) and in Venice (San Marco); cf. Harrison, *Temple for Byzantium*, 117.

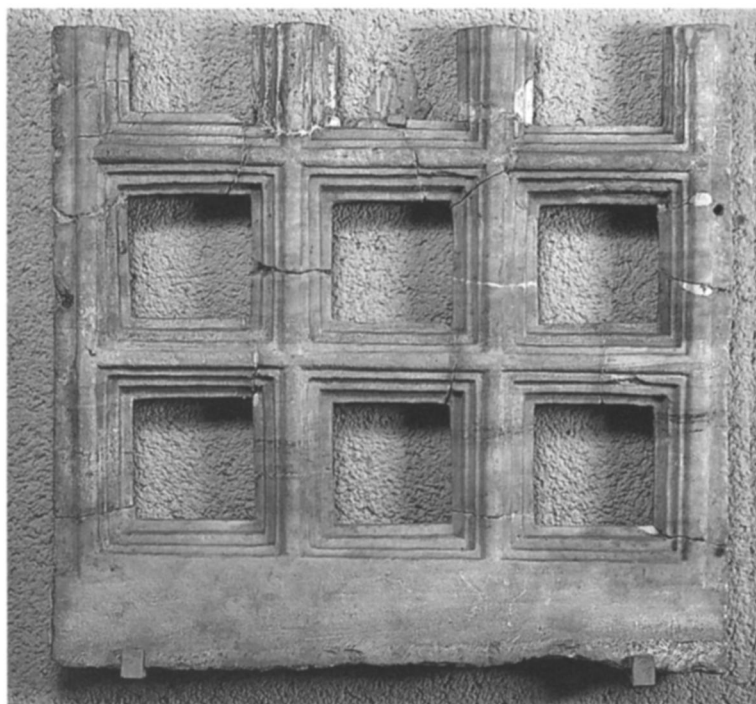
17 *Antologia Palatina* 10, vv. 48–50, 2nd ed., ed. F. M. Pontani (Torino, 1978), 1:13.

18 Cf. Kitzinger, "Artistic Patronage," 45. I. Shahid ("The Church of Hagios

Polyeuktos in Constantinople: Some New Observations," in *Βυζάντιο, κράτος και κοινωνία: Μνήμη Νίκου Οικονομίδη*, ed. A. Avramea, A. Laiou, and E. Chrysos [Athens, 2003], 467–80), has again taken up the question of the deep antagonism between Justinian and Anicia, who legitimized her son as pretender to the throne of Byzantium. Fortunately for Justinian, Anicia's death occurred before St. Polyeuktos could be completed. Thus, instead of serving as political propaganda, it was reduced to a mausoleum.

14 Kitzinger, "Artistic Patronage," 55; M. Harrison, *A Temple for Byzantium: The Discovery and Excavation of Anicia Juliana's Palace Church in Istanbul* (Austin, 1989), 545.

15 R. M. Harrison and M. V. Gill, "The Window Glass," in *Excavations at Saraçhane in Istanbul* (Princeton, N.J., 1986), 1:204–6; Harrison, *Temple for Byzantium*, figs. 152 and 153. Some crown glass fragments have been found there, but part of them come from disturbed archaeological strata, which date possibly from late Byzantine and Ottoman times. The cylinder method consisted of collecting a mass of molten glass at the end of a long iron tube (about 1 to 1.45 m long, and 6–16 mm in diameter). By blowing into the tube a cylindrical bubble was formed and then modeled by turning it on a flat stone surface. The lower end of the bubble was exposed to the heat to liquefy it, and the hole so formed was widened with a small wooden stick until it was the same diameter as the center of the bubble. Then the bubble, while still hot, was detached from the tube and enlarged at the opposite end to form a cylinder; this was then cut lengthwise with shears and put in the cooling oven to distend and flatten out.



**Fig. 2** Stone transenna from the church of Constantine Lips. Istanbul, Archaeological Museum, 10th century (photo courtesy of Istanbul Archaeological Museum)

Nothing has been found of the original glazing of Hagia Sophia, although literary sources mention it. A contemporary of Justinian, Paul the Silentiary, composed a panegyric about Hagia Sophia, which he read before a large audience in the imperial palace as well as in the patriarchal palace.<sup>19</sup> To exalt further the vision he adopted fantastic metaphors, such as the strongly lit golden mosaic of the main conch that brought tears to the eyes of the observer, creating an optical effect of gold melting downward.<sup>20</sup> Furthermore he emphasized the great luminosity of the interior, comparing the main dome to the sky, where the numerous windows screened by glass allowed the penetration of the golden light of dawn.<sup>21</sup> Ignatius of Smolensk, a Russian bishop who came to Constantinople in 1389 and was the first visitor to the city to have left a record of his inspection of the dome, made a precise survey of the windows, counting and measuring them. He was interested in documenting the dome's extraordinary luminosity.<sup>22</sup>

An image that suggests the form of these windows is offered by the vestibule mosaic at the southwestern end of the narthex. It represents Constantine and Justinian, on either side of the Virgin, offering her models of the city of Constantinople and of Hagia Sophia. In the image of the latter are clearly represented large quadrangular grilled screens with semicircular tops. Obviously this is a mosaic representation made in the late tenth century, long after the original construction, which may have been inflected to a considerable degree by idealization. Nevertheless this representation illustrates windows of proportions like those commonly found in late-antique public buildings.<sup>23</sup> Martin Harrison, the excavator of St. Polyeuktos, noted an affinity between the grandiose window arrangement there and that of Hagia Sophia, describing both churches as "highly fenestrated."<sup>24</sup>

21 Paul the Silentiary, *Descriptio ecclesiae Sanctae Sophiae*, vv. 407–10 and vv. 509–11, PG 86:2135 and 2138–39. Due to an earthquake, part of the cupola collapsed in 558, only twenty years after its consecration. It was rebuilt of Rhodian tufa with a reduced diameter, but 7 m higher. This dome, too, was damaged by the earthquake of 989, and partially destroyed in 1346. The present cupola was financed by a special public tax instituted in 1354.

22 G. P. Majeska, "The Journey of Ignatius of Smolensk to Constantinople (1389–92)" (PhD diss., Indiana University, 1968), 20, 94, 193–96, and idem, *Russian Travelers to Constantinople in the Fourteenth and Fifteenth Centuries*, DOS 19 (Washington D. C., 1984), 96, 231ff.

23 See R. Günter, *Wand, Fenster und Licht in der spätantik-frühchristlichen Architektur*, pt. 2, *Katalog* (PhD diss., Munich, 1965), and idem, *Wand, Fenster und Licht in der Trierer Palastaula und in spätantiken Bauten* (Herford, 1968); more recently, see G. Eder, "Licht und Raumform in der spätantiken Hallenarchitektur," in *Licht und Architektur: Schriften des Seminars für klassische Archäologie der Freien Universität*

Berlin, ed. W.-D. Heilmeyer and W. Hoepfner (Tübingen, 1990), 131–41; in the same volume, J. T. Köhler, "Basilika und Thermenfenster: Die Verwendung des Lichts in der Architektur der Spätantike," 123–30. Windows belonging to sixth-century buildings differed from the elongated type that developed in Byzantine architecture by the ninth century, when the number of windows was reduced, as well as their width, in favor of more slender proportions. Among the exceptions, there is the church of St. Catherine at Sinai (mid-6th c.) where the windows were much smaller; see W. Loerke, A. Cutler, and A. Kazhdan, "Window," *ODB* 3:2198–99.

24 *Temple for Byzantium*, 549 (n. 14 above).

19 Prokopios and Paul the Silentiary resorted to traditional metaphors to transmit their emotional experiences of Hagia Sophia, often disclosing an interest in structural techniques, as well as a certain familiarity with actual equipment. See A. Cutler, "The Right Hand's Cunning: Craftsmanship and the Demand for Art in Late Antiquity and the Early Middle Ages," *Speculum* 72.4 (1997): 971–94, esp. 976–77; R. Webb, "The Aesthetics of Sacred Space: Narrative, Metaphor, and Motion in Ekphrasis of Church Buildings," *DOP* 53 (1999): 59–74, esp. 70–71.

20 Webb ("Aesthetics," 68–69) analyzes the rhetorical refinements used by Paul the Silentiary, Prokopios of Caesarea, and Michael the Deacon (12th c.) in descriptions of important Constantinopolitan buildings, especially Hagia Sophia and the Church of the Holy Apostles. These texts belong to the literary category of *ekphrasis*, which rather than mere physical descriptions are sensory experiences of an object translated into words. A. Kazhdan and A. Cutler ("Continuity and Discontinuity in Byzantine History," *Byzantion* 52 [1982]: 429–78, esp. 457) state that Byzantine ekphrastic texts, rather than limiting themselves to the descriptive details of an iconographic program, intended to suggest in lyrical tones the beauty of a site and the uniqueness of a sacred space, and therefore it is unreasonable to expect from such literary testimonials more than what it is actually said.

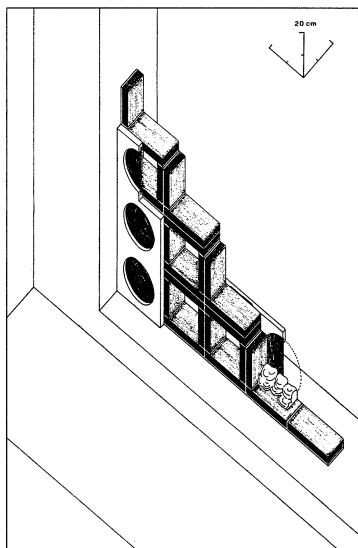
Large panels of colored cylinder glass, possibly intended for insertion into gridded frameworks, have been discovered at the important late-antique market city of Sardis, stored in two of the numerous shops flanking the synagogue and the gymnasium.<sup>25</sup> These panes, aquamarine in color and rectangular in form, measured as much as 30 × 40 cm, and are, in some instances, rounded on one side so as to adapt to the curvature of a window with a semicircular top. They were accompanied by lead-came-like objects.

Fragments of rectangular and triangular cylinder-blown panels, and their leading, unearthed on the site of the early Christian basilica near the modern museum of Philippi in Greece, also belong to the Justinianic period. This glass is delicately colored in tones of green, blue, and yellow. It seems to have come from windows with alternating panels cut in geometric shapes, the ensemble resembling contemporary examples of *opus sectile*.<sup>26</sup> In some respects, they also resemble some of the earliest examples of colored-glass screens found in the medieval West, such as those of Jarrow and Wearmouth in Northumbria (7th–8th c.), which have been compared to mosaic patterns in their manner of juxtaposing variously colored geometrical elements.<sup>27</sup>

The southern bath complex of Bosra in Syria offers a clue regarding the transition between the typical late-antique window-screening device (wooden or marble quadrangular window screen with glass panes that were cylinder blown or cast in molds), and Byzantine stucco screens with circular perforations closed with crown-blown disks (fig. 3).<sup>28</sup> The various phases of this building span a long period of time, between the Hadrianic age and the early Byzantine era, followed by the 'Umayyad period (early 2nd to the 7th–8th centuries), and in fact the many windows show the remains of different kinds of screening systems.<sup>29</sup> In the earliest windows of the Bosra baths, there are traces of double glazing, with wooden frames enclosing glass panels, whereas in the later windows one sees traces of screens made with a brick grille, in which the openings were glazed either with crown glass disks or with panels of cylinder glass. Here stucco was added to the brick to make circular openings. It remains difficult to pinpoint the exact moment marking this intermediate stage, which eventually produced the screen with circular openings, a type that spread widely throughout the Late Byzantine world.

28 The crown method consists of blowing a glass bubble, which is then pierced, opened, and rotated on the tube until a disc is formed, the diameter of which varied according to the glass mass in hand to a maximum of 1.50 m. The central part of the disc, called the *omphalon*, or bull's eye, is very thick because it remains attached to the blowing tube during the working process.

29 H. Broise, "Vitrages et volets des fenêtres thermales à l'époque impériale," in *Les Thermes romains: Actes de la table ronde organisée par l'École française de Rome; Rome 11–12 novembre 1988*, Collection de l'École Française de Rome 142 (Rome, 1991), 61–78, esp. 69ff.



25 As a privileged Jewish trade, the sale of glass seems to have been important to the economy of the place between the early 5th and early 7th century; see A. von Saldern, *Ancient and Byzantine Glass from Sardis*, Archaeological Exploration of Sardis, Monograph 6 (Cambridge, Mass., 1980), 91–92. A study concerning the various shops has been made by J. S. Crawford, *The Byzantine Shops at Sardis* (Cambridge, Mass., 1990), 9 for leading and 78–79 for the glass shops.

26 Kourkoutidou-Nikolaïdou, "Vitreaux paléochrétiens à Philippi," 291 (n. 2 above).

27 R. Cramp, "Decorated Window-Glass and Millefiori from Monkwearmouth and Jarrow," *AntJ* 50 (1970): 327–35; idem, "Window-Glass from the Monastic Site of Jarrow: Problems of Interpretation," *JGS* 17 (1975): 88–96. Besides the panels with geometric patterns, another screen has been reconstructed with a holy figure on it (possibly Christ), which has caused considerable speculation among scholars, because so far it remains a unique example in the West, where otherwise the earliest examples of figurative window glass are Carolingian.

**Fig. 3** Late antique window screened with bricks, and a plaster transenna with circular holes filled with glass. Thermal complex, Bosra, Syria (drawing after Broise, "Vitrages et volets" [as in n. 29])

One of the earliest examples of this type of screen with circular openings was recently discovered at Amorium (see previous article by Lightfoot), the capital of the province of Anatolikon, in a basilica built near the center of the city toward the end of the fifth or the beginning of the sixth century.<sup>30</sup> It had a *synthronon*, colonnades between the aisles and the nave, and rich *opus sectile* panels on the walls and floor. The church was severely damaged by fire and partially collapsed, probably in 838, when the Arabs besieged and then sacked the city. Subsequently the church was completely rebuilt between about 850 and 950.<sup>31</sup>

In this second building campaign, the outer walls of the original structure were preserved while the interior underwent a complete rearrangement. The architects decided to replace the largely destroyed late antique colonnades with four piers that would support a dome. The interior was also decorated with new carved and painted furnishings, mosaics with gold backgrounds, and glazed stucco screens.<sup>32</sup> The marble pavement was replaced with a new *opus sectile* floor.<sup>33</sup> At this time, the windows were narrowed and furnished with stucco screens, through which light filtered via pale green glass disks.<sup>34</sup> These very thin crown-glass disks, which measure approximately 18–20 cm in diameter, are clearly linked to the Middle Byzantine reconstruction.<sup>35</sup> All this was discovered at a level beneath the detritus that accumulated from the thirteenth century onward during the Seljuk and Ottoman occupation of the city. The church lost its original function in the late eleventh century and was subsequently used as a shelter for people and animals.<sup>36</sup>

34 Narrowing: Eric A. Ivison, oral communication, Amorium-Hisarköy, August 2002. At Amorium the evidence of glass working—but not its production—is based upon the presence of glass cakes and fragments, as well as slag. Some of these fragments may be datable to the sixth and seventh centuries; see M. Gill, ed., *Amorium Reports, Finds*, vol. 1, *The Glass (1987–1997)*, with contributions by C. S. Lightfoot, E. A. Ivison, and M. T. Wypyski, BAR International Series 1070 (Oxford, 2002), 105, nos. 612–17; 225–28, 263, and pls. 15–16 on p. 236.

35 They were found in the north aisle of the church; see Gill in C. S. Lightfoot et al.,

“Amorium Excavations 1995: The Eighth Preliminary Report,” *AnatSt* 46 (1996): 91–110, esp. 106–9; Lightfoot and Ivison, “The Amorium Project: The 1995 Excavation Season,” *DOP* 51 (1997): 291–300, esp. 296 and fig. C for a drawn reconstruction of a restored disk. See also Gill, *Amorium*, 1:271–72. A catalog of the stucco fragments from the screens was prepared by the present writer during the summer of 2002.

36 From the church come also some fragments of dark and thick cylinder glass, which may have arrived there by chance, together with many other kinds of late antique material, when the floor was filled in at a later date.

30 Among the numerous preliminary studies on the Amorium excavations, see C. S. Lightfoot et al., “The Amorium Project: The 1997 Study Season,” *DOP* 53 (1999): 333–49.

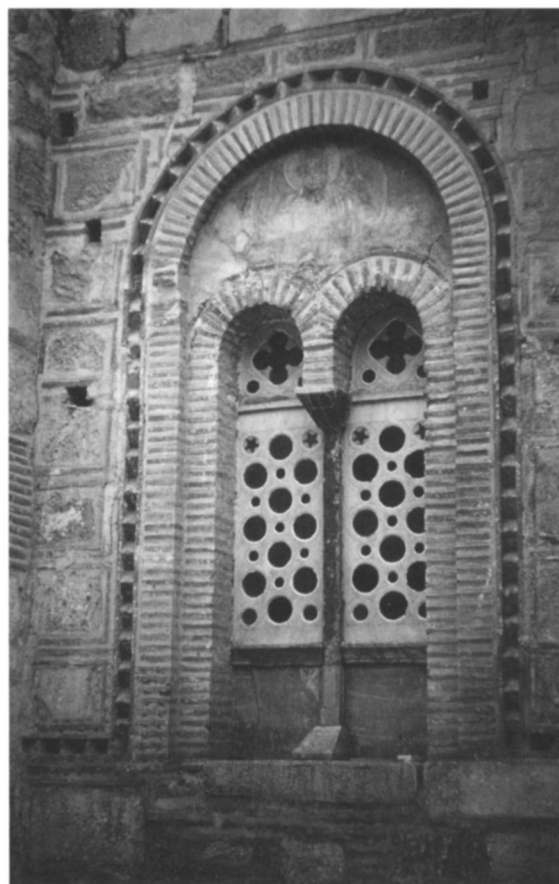
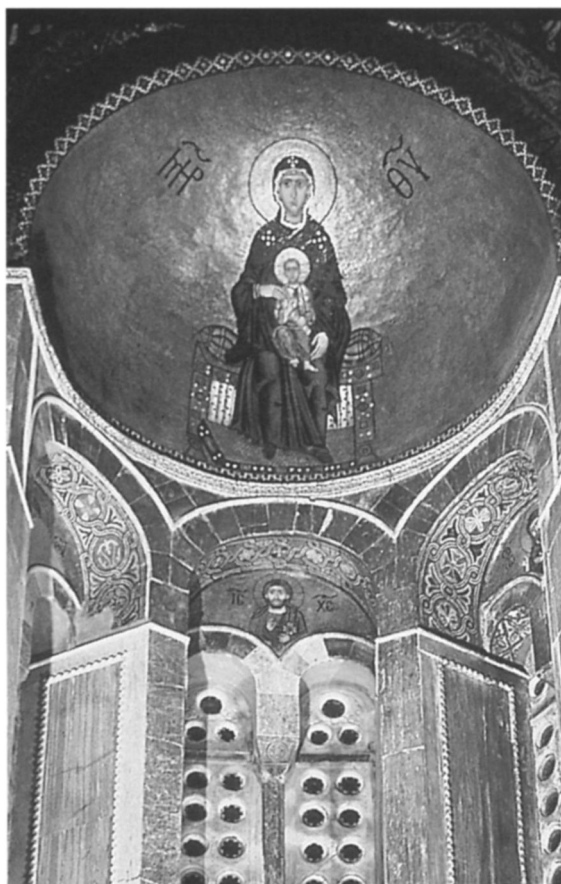
31 R. M. Harrison et al., “Amorium Excavations 1991: The Fourth Preliminary Report,” *AnatSt* 42 (1992): 207–22, esp. 212. During the excavation campaign of 2002 several tombs set in a row were discovered in the narthex (see pp. 243–56 in this volume). These contained the remains of various personages, evidently of high rank, as yet unidentified. But it is known that the patron of the second phase of the building’s construction was a bishop, commemorated by a now fragmentary inscription, discovered in 1991 and studied by C. Mango (ibid., 212).

32 R. M. Harrison et al., “Excavations at Amorium: 1992 Interim Report,” *AnatSt* 43 (1993), 147–62, esp. 149; C. S. Lightfoot et al., “Amorium Excavations 1993: The Sixth Preliminary Report,” *AnatSt* 44 (1994): 105–28, esp. 107ff., 121–22.

33 Lightfoot, “Amorium Excavations 1993,” 108–10; C. S. Lightfoot et al., “Amorium Excavations 1994: The Seventh Preliminary Report,” *AnatSt* 45 (1995): 105–36, esp. 108 ff.

**Figs. 4–5** Fragmentary molded plaster transenna, recto and verso. Hisarköy-Amorium, 9th–10th century (photos by T. Çakar)





Even though the screens are fragmentary, they are of extraordinary importance because they constitute the earliest known examples of molded stucco screens with circular openings of the type that eventually became the norm in Byzantine architecture from the eleventh century on. The circular openings destined to receive the glass are multilobed (figs. 4, 5), and in this respect are very similar to the oldest window screens at Hosios Loukas, Phokis, which date to the first quarter of the eleventh century (figs. 6, 7).<sup>37</sup> The Amorium stucco screens are adorned with petaled flowers and geometrical figures, traced out with compasses and a straightedge into the dry stucco, and emphasized by strokes of reddish paint, along with deeply drilled holes into which, perhaps, was inserted glass or other colored material, all of which contributed to an intense chiaroscuro effect.

**Fig. 6** Hosios Loukas, apsidal window with molded plaster transennae (photo courtesy of Dumbarton Oaks, Washington, D.C.)

**Fig. 7** Hosios Loukas, west façade, north window with molded plaster transenna (photo courtesy of Dumbarton Oaks, Washington, D.C.)

37 See C. Diehl, *L'église et les mosaïques du couvent de Saint-Luc en Phocide: Études d'archéologie byzantine*, Bibliothèque des Écoles Françaises d'Athènes et de Rome 55 (Paris, 1889) 31; R. W. Schultz and S. H. Barnsley, *The Monastery of Saint Luke of Stiris, in Phocis, and the Dependent Monastery of Saint Nicolas in the Fields, near Skripou, in Boeotia* (London, 1901), tav. 29; and E. G. Stikas, *Τὸ οἰκοδομικὸν χρονικὸν τῆς μονῆς Ὁσίου Λουκά Φωκίδος* (Athens, 1970), pls. 118–19 and idem, *Ὁ κτήτωρ τοῦ*

*καθολικοῦ τῆς μονῆς Ὁσίου Λουκά* (Athens, 1974), pl. 18. Other parallels for molded plaster screens with crown disks, although not identical in all respects, can be found in a monastery dependent upon Hosios Loukas, Hagios Nikolaos at Skripou in Boeotia, but also much later on in the church of the Dormition of the Virgin at Gračanica in Kosovo built by King Milutin (†1321); see Ćurčić, *Gračanica*, 61–62 and 121–22, fig. 78 (n. 6 above).

The screen type with circular openings closed by disks of colored glass is echoed in the early ninth-century Saint Zeno chapel in Santa Prassede in Rome, founded by Pope Paschal I (r. 817–824) as a burial chapel for his mother. A refined combination of sculpture—ancient and contemporary—along with gold background mosaics, created an ambience of great decorative richness inspired by Byzantine court art, brightened now only by a single window corresponding to a semicircular opening in the opposite wall above the entrance door. Two side windows, blocked in the fifteenth century, were covered with a mosaic revetment imitating a screen with circular openings with variously colored disks, amounting to a virtual reproduction of the disk-shaped windows that they must have replaced (figs. 8–9).<sup>38</sup> Even if these no longer had any practical use for illumination, their similarity to actual screens had a function within the internal decorative program that still retains, in mosaic, the original pairs of holy figures piously turned toward the apertures.<sup>39</sup>

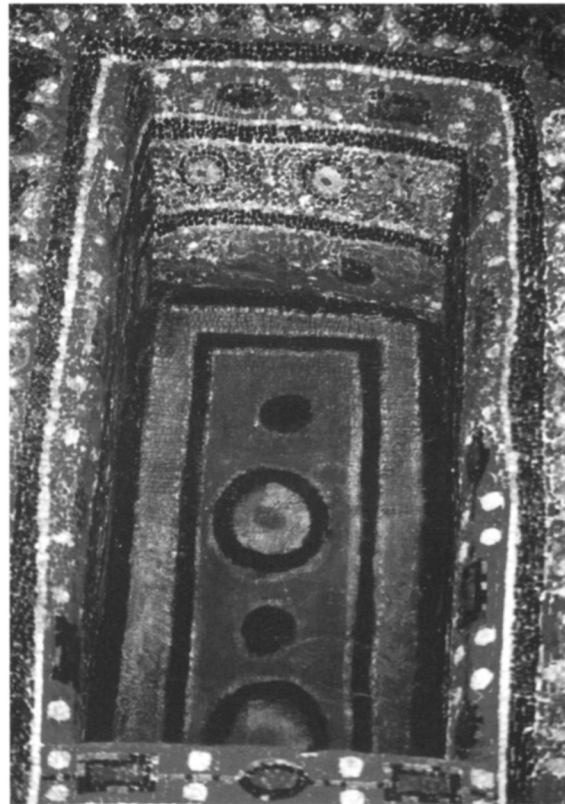
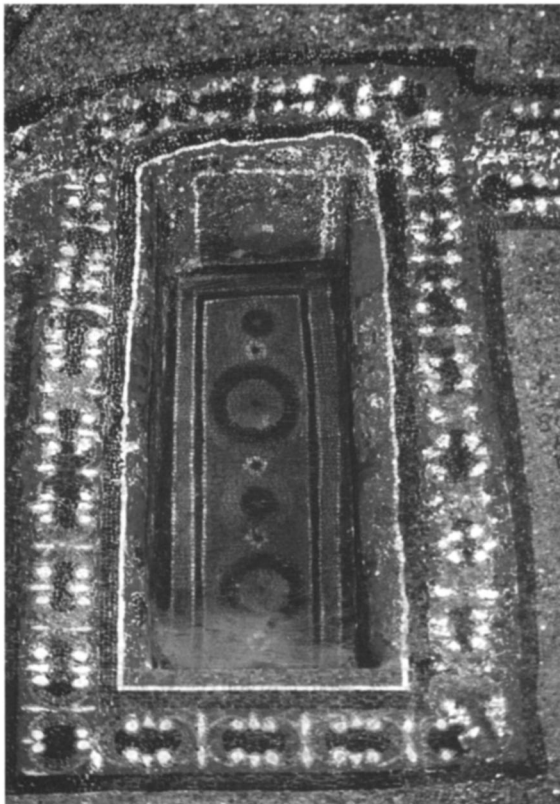
Although there is still only sporadic material evidence for the use of window glass between the fourth and sixth centuries in both the East and West, and although it is difficult to trace a clear line of development, it seems likely that the Santa Prassede mosaic reproduces a type of screen widely adopted in Byzantine buildings, but rare on the Italian peninsula. In fact, as previously stated, the windows of Middle Byzantine churches were filled generally with molded plaster screens, with crown-disks inserted into circular, sometimes multilobed openings. They became common from the tenth century on. Examples of their widespread use can be seen in the Byzantine dependency of Kievan Rus', where the decorative and architectural scheme was realized in locally available materials such as wood.<sup>40</sup> Also, in territories not directly under Byzantine rule but geographically adjacent to the empire, variations on the theme of

38 The single window on the east wall has a pictorial decoration with the same motif, probably replacing a lost mosaic. On the Byzantine inspiration of the chapel of Saint Zeno, recognized by Richard Krautheimer and others, see C. B. McClendon, "Louis the Pious, Rome and Constantinople," in *Architectural Studies in Memory of Richard Krautheimer*, ed. C. L. Striker (Mainz, 1996), 103–6, esp. 104. The reproduction in paint of a false window closed with disks has been observed in a corridor of the Middle Byzantine church of the Chora (Ousterhout, *Kariye Camii*, fig. 94 [n. 5 above]; Ousterhout, *Master Builders*, 153 [n. 4 above]).

39 Elsewhere in the building, as in the upper room of the north transept, stucco screens were employed in patterns of rows of small arches and cruciform tracery (9th c.); see L. Pani Ermini, ed., *La diocesi di Roma: La IV regione ecclesiastica*, Corpus della scultura altomedievale 7 (Spoleto, 1974), 130–31, who gives no measurements of these screens because of their inaccessibility.

40 Ousterhout, *Master Builders*, 154.

**Figs. 8–9** Saint Zeno chapel. Santa Prassede, Rome. Windows blocked and decorated in modern times (photo by author)



transennae with circular holes are countless, although usually they were made in stone and they lacked glass panes.<sup>41</sup> To give an idea of the diffusion of this kind of screen, one may cite a stone example in the small, narrow apse window in the remote church of San Pietro *ad Oratorium* near Capestrano in Adriatic Italy, dating to the twelfth century (fig. 10).<sup>42</sup>

### *“Variations” with Lead and Glass in Window Screening*

With regard to novelty and “variation” among Byzantine window screens, examples include the church of the Virgin in Studenica, Serbia, and in Lesnovo, Macedonia.<sup>43</sup> In Studenica a peculiar glazed window, dating to the twelfth century, can still be seen in situ. It is set into a slender lancet, measuring approximately 2.00 × 0.80 m, and consists of a sheet of thin lead panels, pierced with tiny holes representing foliage and animals. These panels were applied to colored glass panes. Eutychia Kourkoutidou-Nikolaïdou points out that the Studenica window is closer to sculpture than to stained glass. In fact she believes that the Studenica screen was created by talented sculptors who were active in the church and who might have introduced this inventive “leaded and glazed” screen instead of the more common molded plaster or stone transennae with circular holes. An interesting aspect of Studenica is that the lead was not employed to connect the glass panels physically, but was an integral element of an innovative kind of decoration.<sup>44</sup>

Something similar happened at Lesnovo, in a church built around the middle of the fourteenth century. Here some of the original window screens had colored glass panels further enriched with superimposed thin lead sheets.<sup>45</sup> There are no other known Byzantine examples comparable to the decorative patterns on these lead sheets. Mirjana Ljubinković ventured to compare them with art produced in southern Italy or in the region between the Rhine and the Meuse.<sup>46</sup>

Pierced lead sheets were visible until recently in the cathedrals of Palermo and Monreale in Sicily, although it is impossible to establish if these were part of the original Norman furnishing of the twelfth century.<sup>47</sup>

43 Apart from truly revolutionary innovations, the “variations” in art history remain in a traditional stream; see B. Brenk, “Originalità e innovazione nell’arte medievale,” in *Tempi Spazi Istituzioni*, ed. E. Castelnovo and G. Sergi, *Arti e storia nel Medioevo 1* (Torino, 2002), 3–69, esp. 6.

44 Kourkoutidou-Nikolaïdou, “Vitreaux paléochrétiens à Philippes,” 288 (n. 2 above).

45 See the illustration in Ousterhout, *Master Builders*, 155, fig. 115.

46 R. Ljubinković, “Sur un exemplaire de vitreaux du monastère de Studenica,” *Archlug* 3 (1959): 137–41; R. Ljubinković, “Un vitrail en plomb à l’église de la Vierge à Studenica,” *Musée des arts décoratifs: Recueil de travaux (Belgrade)* 6–7 (1960–61): 19–27; M. Corović-Ljubinković, “Quelques problèmes relatifs au verre médiéval en Serbie,” in *Verre médiéval aux Balkans*, 63–69, esp. 66–68 (n. 1 above).

47 Cf. A. Salinas, “Trafori e vetrate nelle finestre delle chiese medioevali di Sicilia,” in *Centenario della nascita di Michele Amari*, ed. G. Salvo-Cozzo (Palermo, 1910), 2:495–507. However, earlier pierced lead sheets were also found at the monastery of San Vincenzo al Volturno (south central Italy), dating to the ninth century and containing geometric patterns. They may have been used in combination with flat glass in liturgical furnishings, such as small glazed screens or lamps (C. Coutts, in *San Vincenzo al Volturno*, vol. 3, *The Finds from the 1980–86 Excavations*, ed. J. Mitchell and I. L. Hansen, *Studi e ricerche di archeologia e storia dell’arte 3* [Spoleto, 2001], pt. 1, chap. 14, cat. entries 1–6).

41 Molded plaster screens in the windows can be numbered also among the similar elements shared by Byzantine and Islamic architecture; they imply a certain continuity between Byzantine and Ottoman building practice. Stucco window screens, with small more-or-less-circular perforations filled by glass, represent a “middle-eastern version” of stained glass, which continued in Byzantine and subsequently Ottoman territories until modern times. For Turkey see C. E. Arseven, *L’Art Turc depuis son origine jusqu’à nos jours* (Istanbul, 1939); for the Middle East in general, H. G. Franz, “Window Screens als Fensterverschluss: Ihre Entwicklung von der frühchristlichen bis zur islamischen Zeit,” *IstMitt* 8 (1958): 65–81; for the Balkans, Han, “Origin and Style,” 118 (n. 6 above).

42 The Abruzzi, like the entire east coast of Italy, was in continuous contact with the opposite Adriatic shore, which remained in Byzantine hands until the Ottoman conquest.

**Fig. 10** Apsidal window with stone transenna. San Pietro *ad Oratorium*, Capestrano, 12th century (photo by author)



## Were Byzantine Glaziers Active in Central and Southern Italy?

In the second half of the eleventh century, in south central Italy, which had been newly conquered by the Normans, the monastery of Montecassino was the center of the largest architectural project in the area. This project is also of great importance for the history of stained glass. Leo of Ostia, in his *Chronicle*, mentions that Abbot Desiderius (1058–87) summoned Constantinopolitan craftsmen to Montecassino to provide the motherhouse of the Benedictine order with the finest mosaics and *opus sectile* work.<sup>48</sup> Desiderius wished to revive the golden age of Roman Christendom, which coincided with the reign of Constantine the Great. This was part of the general revival that accompanied the reform of Pope Gregory VII (d. 1085), with whom Desiderius was a close collaborator. Apparently the monastery was unable to find local artisans with the desired level of artistic skill.<sup>49</sup> The abbot, therefore, decided to turn to Byzantium as the repository of the antique tradition. Leo says that these artisans taught the young novices the arts of “auro vel argento, aere, ferro, vitro, ebore, ligno, gipso vel lapide” (“the goldsmith’s and silversmith’s art, bronze casting, iron and glass working, ivory and wood carving, plaster modeling, and stone carving”).<sup>50</sup>

Leo specifies that the windows of several monastery rooms had screens with either leading or molded plaster, and that the nave of the church had glass and lead screens, whereas the remaining windows had molded plaster screens.<sup>51</sup> I believe this variety was due to a deliberate “marking” of a hierarchy of spaces, with multicolored glazed screens only in the focal windows. At the same time, the contemporaneous use of various screen types reflects the participation of different workshops or craft traditions.<sup>52</sup> Unfortunately Montecassino has endured severe and repeated destruction, and the only form of art produced *in loco* that has survived from the time of Desiderius is book illumination. But since these manuscript illuminations betray no trace of “external” influence on the traditional Cassinese book style, we must deduce that the foreign artisans were selected to teach the young monks in other arts, such as mosaic, plaster, goldsmithing, ivory carving, and glassworking, as stated in the *Chronicle*.

No traces of the window glazing at Montecassino have survived, but perhaps an echo of the stucco screens can be found in the last monument created under Desiderius’s patronage—the abbey church of the monastery of San Benedetto in Capua, built during the late eleventh century. Here recent restorations have brought to light molded plaster screens, which are still in situ with their contemporary crown-blown glass. Over the centuries the screens became damaged, but they were restored during the seventeenth-century refurbishing of the building. The damaged areas of the screens were whitewashed and then painted in imitation of the missing parts; even the characteristic crown disks were reproduced by painting so that the total visual effect would be preserved (although no more light was filtering through).<sup>53</sup> The design of the screens is geometric in inspiration, with interlace surrounding circular holes filled with glass disks (fig. 11). The arrangement of the window screens, as well as their materials, resembles parallel examples in the Byzantine Empire and is

48 Leo of Ostia, *Chronica Monasterii Casinensis* 3.27, ed. H. Hoffmann, MGH *Scriptores* (Hannover, 1980), 34:396. For comments see F. Aceto and V. Lucherini, eds., *Leone Marsicano, Cronaca di Montecassino* (III 26–33), Biblioteca di cultura medievale, Di fronte e attraverso 570 (Milan, 2001), 16 and 31–32.

49 The importance Leo of Ostia ascribes to these craftsmen for the recovery of “lost” artistic techniques is exaggerated, but it is typical of laudatory literature. Mosaics, as well as glass windows, had not disappeared in Italy during the five centuries preceding the so-called revival of the arts under Abbot Desiderius.

50 *Chronica Monasterii Casinensis* 3.27 (Hoffmann ed., 396).

51 *Ibid.*, 3.10, 28, and 33 (Hoffmann ed., 372, 405–6 & 408, and 726–27).

52 For a discussion about several western medieval examples of stained glass used to create a spatial hierarchy, see Dell’Acqua, “*Illuminando colorat*,” 50–51, 69, 121–22 and 136 (n. 3 above).

**Fig. 11** Molded plaster transenna with glass disks. San Benedetto, Capua, late 11th century (photo by author)



53 For the history of the monastic foundation, see L. Speciale and G. Torriero Nardone, “Sicut nunc cernitis satis pulcherrimam construxit: La basilica e gli affreschi desideriani di S. Benedetto a

Capua,” *Arte Medievale* 9.2 (1995): 87–103. My information on the screens and glass remains, still entirely unpublished, is due to Lucinia Speciale (Università di Lecce).

most likely influenced directly by the mother abbey at Montecassino, where Constantinopolitan craftsmen had been active.<sup>54</sup> I have elsewhere suggested that the plaster screens of Capua, together with the painted window glass associated with the Romanesque phase of San Vincenzo al Volturno, perhaps complete the picture of the various types of window screens used in Desiderian Montecassino as described by Leo of Ostia.<sup>55</sup> In fact the construction of the “new” abbey of San Vincenzo, built in the late 11th century, was promoted by one of Desiderius’s pupils, Abbot Gerard (1076–1109).<sup>56</sup>

Another Italian monument that has recently aroused controversy over its relevance (or not) to the Byzantine artistic world is the abbey church of the Santissima Trinità in Mileto, Calabria, founded around 1080 by Robert de Grantmesnil, an abbot from Normandy who was closely related to the Hauteville family, the recent conquerors of southern Italy.<sup>57</sup> The plan of this church has a strong French imprint, with a protruding transept and a choir with three apses of graduated size, based on the celebrated prototype of Cluny II and otherwise unprecedented in southern Italy.<sup>58</sup> The church itself is not preserved, but archaeologists have recovered fragments of the original stained glass.<sup>59</sup> The glass sheets were made by the cylinder method; they are deep blue, violet, pink, and green, and painted with a dark grisaille. Among the most interesting pieces is a violet pink fragmentary pane representing an eye and part of a curly lock of hair of a size appropriate to a human figure about 1 m high. Those who have studied the site judged this fragment of figurative stained glass window to be a “twelfth-century Byzantine expression,” and stylistic comparisons were sought in contemporary mural painting in the area.<sup>60</sup> But the limited remains of the panel do not allow for easy comparisons, either with local figural art or with what eventually developed in the abbey. Furthermore, we know nothing about glass production in southern Italy that could be related to any Byzantine glass tradition.

The Mileto stained glass evidence, found in a region that had long been under Byzantine rule, has led scholars to the same kind of debate as that regarding the Pantokrator and Chora churches: was there a tradition of figurative stained glass in the Byzantine world?

### *Figural Stained Glass: An Occasional or Recurrent Feature in Byzantine Architecture?*

The earliest surviving piece from a figurative stained glass window in a Byzantine monument is a disk (fig. 1) painted with an enthroned Christ from the basilica of San Vitale in Ravenna, a church built under Justinian (d. 565). The disk has been dated to the sixth century, since it has been connected with the original decorative ensemble consisting of mosaics, *opus sectile*, modeled plaster, and sculpture. The disk was found at the beginning of the twentieth century in a poorly documented excavation. It has attracted the attention of Byzantinists and medievalists, most of whom regard it as “the most ancient example of stained glass.”<sup>61</sup> F. W. Deichmann is the only major scholar to have

54 In this regard, see the commentary on Leo of Ostia’s text in Aceto and Lucherini, *Leone Marsicano*, 31. A screen with circular holes, without a trace of glass disks, is located in the cloister of San Lorenzo fuori le Mura in Rome. On it is an inscription from the time of Pope John XVIII (1003–1009), published by F.

Mazzanti, “La scultura ornamentale romana nei bassi tempi,” *Archivio Storico dell’Arte*, series 2, 2.3 (1896): 161–87, esp. 168–69.

55 Dell’Acqua, “*Illuminando colorat*,” 73.

56 F. Dell’Acqua, “Shades of Desiderius: An Early Example of Italian Stained-Glass from the Romanesque Abbey of San Vincenzo al Volturno (Molise, Italy),” in *Stained Glass as Monumental Painting: Proceedings, Corpus Vitrearum Medii Aevi, XIXth International Colloquium (Kraków 1998, 14–16 May)* (Krakow, 1999), 81–95.

57 A historical excursion is outlined by P. Peduto and R. Fiorillo, “Saggi di scavo nella Mileto Vecchia in Calabria (1995 e 1999),” in *II Congresso Nazionale di Archeologia Medievale, Musei Civici, Chiesa di Santa Giulia, Brescia, 28 Settembre–1 Ottobre 2000*, ed. G. P. Brogiolo (Florence, 2000), 223–33.

58 M. D’Onofrio, “Il panorama dell’architettura religiosa,” in *I Normanni, popolo d’Europa: 1030–1200*, exh. cat., 24 Jan.–30 Apr. 1994, Rome, Palazzo Venezia, ed. M. D’Onofrio (Venice, 1994), 199–207, esp. 203–5.

59 Fiorillo, in Peduto and Fiorillo, “Saggi di scavo,” 230–31.

60 Ibid.

61 C. Cecchelli, “Vetri da finestra del S. Vitale di Ravenna,” *FR* 35.2 (1930): 1–20; A. H. S. Megaw, “Notes on Recent Work of the Byzantine Institute in Istanbul,” *DOP* 17 (1963): 333–71; G. Bovini, “Les plus anciens vitraux de l’église Saint-Vital de Ravenna,” in *Annales du 3e Congrès des Journées Internationales du Verre, Damas, 1964*

(Liège, 1964), 85–90; J. Lafond, “Découverte de vitraux historiés du Moyen Âge à Constantinople,” in *CahArch* 18 (1968): 231–38; J. Philippe, *Le monde byzantin dans l’histoire de la verrerie (Ve–XVIe siècle)* (Bologna, 1970), 92; F. W. Deichmann, *Ravenna: Hauptstadt des spätantiken Abendlandes*, vol. 2, *Kommentar*

(Wiesbaden, 1976), 2:139–41. For a bibliographical review of the San Vitale disks, see F. Paolucci, catalogue entries 700–728, in *La Basilica di San Vitale a Ravenna*, ed. P. Angiolini Martinelli (Modena, 1997), 247–50.

doubted the sixth-century dating of the disk.<sup>62</sup> The absence of any other parallel for this object during the sixth century, in either the West or the East, does not necessarily argue against this dating, but other features make us skeptical.

First there is the structure of the original windows of the sixth-century San Vitale, in which the painted roundel may have been set. In fact, as accurately observed by Deichmann, these had proportions resembling those of the clerestory windows in Constantinian basilicas, which were usually closed by wooden grilles.<sup>63</sup> Examples of these wooden grilles were found in the basilica of Sant'Apollinare in Classe, another Ravennate basilica financed, like San Vitale, by the banker Julianus Argentarius; their horizontal carved cornices were arranged in such a way as to accommodate rectangular glass panels, since lost (figs. 12–13).<sup>64</sup> Therefore it is more likely that in the sixth century the large windows of San Vitale also had similar wooden grilles rather than stucco screens with circular holes holding the glass disks (as G. Bovini and other scholars imagined). Such stucco screens are actually rare in the sixth century: one example of a plaster transenna with glass disks is found in the Justinianic church of St. Catherine at Sinai, but the screen's date is disputed (fig. 14).<sup>65</sup> Although crown glass is known since the fourth century in Roman architecture, both in the East and the West, its setting into stucco screens is not recorded before the ninth century; the earliest known example comes, as already stated, from Amorium.

64 Only dendrochronological analyses can resolve the question of whether these wooden screens date from Justinianic times or from the rebuilding conducted by Pope Leo III in 814, as suggested by Deichmann (*Ravenna*, 239–40).

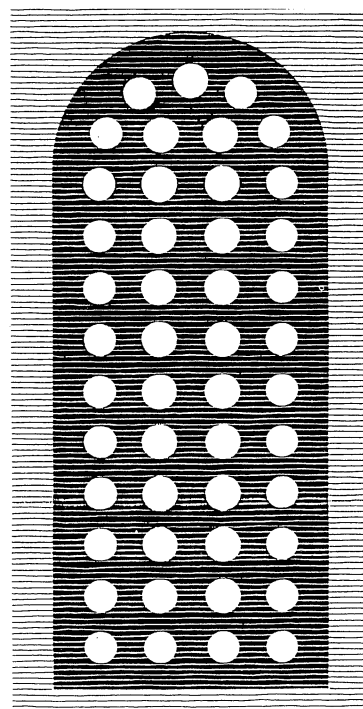
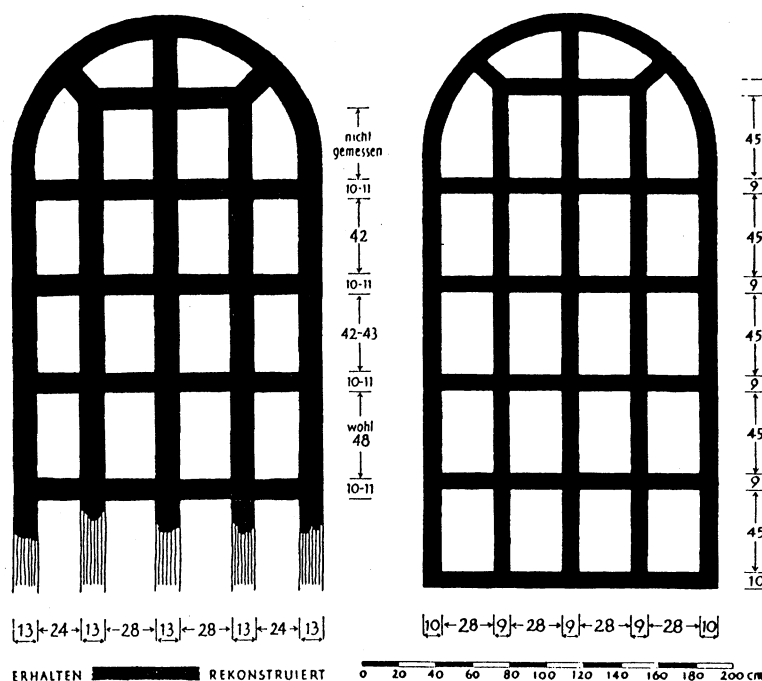
65 C. Meyer, "Crown Window Panes: Constantinian or Justinianic?" in *Essays in Ancient Civilization Presented to Helene J. Kantor*, ed. A. Leonard, Jr. and B. B. Williams, *Essays S.A.O.C.* 47 (Chicago, 1989), 213–19, esp. 215–16.

62 *Ravenna*, 139–41.

63 Deichmann (ibid. 75 and 77) notes the state of preservation of all the windows. For a list of the finds of late-antique window glass finds, which now needs to be updated, see Günter, *Katalog*, pt. 2, 43 (n. 23 above). Among the most recent discoveries are those from the Constantinian basilica in the *Regio V* at Ostia; preliminary reports are by F. A. Bauer et al., "Untersuchungen im Bereich der konstantinischen Bischofskirche Ostias: Vorbericht zur ersten Grabungskampagne 1998," *MDAIRA* 106 (1999): 289–341; A. Martin and M. Einzelmann, "The Joint AAR-DAI Research Project at Ostia: 1998 and 1999 Seasons," *MAAR* 46 (2000): 277–83.

**Figs. 12–13** Graphic reconstruction of the wooden transenna recovered in the basilica of Sant'Apollinare in Classe (drawing after Schöne, *Über das Licht in der Malerei*, 47, fig. 1)

**Fig. 14** Graphic reconstruction of the hypothetical transennae with circular holes set in San Vitale during the 6th century (drawing after Schöne, *Über das Licht in der Malerei*, 47, fig. 1)



Examination of the physical characteristics of the painted roundel from San Vitale reveals that it differs in color from the other disks discovered at the same site, being nearly clear instead of brightly colored. Furthermore, it lacks the characteristic central thickness of crown-glass, the residual “bull’s eye” formed as the glass detaches from the pontil. This shows that the painted roundel was not blown into the form of a disk by the crown method as the others had been, but rather it was clipped with a grozing iron from a piece of cylinder glass.

Scientific analyses are needed to clarify the chemical composition of the glass roundel (and also to compare it to that of the glass tesserae in the Justinianic mosaics), as well as that of the two-toned painting applied to it.<sup>66</sup> The painted roundel exhibits a technology and style that developed long after the Justinianic age: in fact, the application of a two- or three-toned fire-tempered painting, known as *grisaille*, is not attested before Carolingian times, in France and in Germany (late 8th–early 9th c.). After a long process of development, *grisaille* fully evolved only in the thirteenth and fourteenth centuries.<sup>67</sup> I would therefore suggest for the San Vitale painted roundel a date between the ninth and the tenth century, when a Benedictine community moved onto the site and may have promoted some refurbishing of the church.

The other examples of figurative stained glass belonging to the heritage of Byzantium are those uncovered in the Pantokrator and Chora churches in Constantinople, certainly among the most controversial specimens of medieval stained glass, and variously dated to the twelfth or thirteenth century.<sup>68</sup> There are insufficient data to establish whether Constantinopolitan artisans possessed the skill and technology to make figurative stained glass framed and held together with lead comes, a type of artisanship unprecedented in the Byzantine craft tradition. In any case, the close similarities between the two sets of window glass fragments from the Pantokrator and the Chora—both churches linked to the Komnenian family—imply an exchange of master glaziers between the two projects.

Before considering in detail the characteristics of the Pantokrator and the Chora stained glass in order to see possible connections with or divergences from western or eastern Mediterranean glazed screen manufacture, one should note that in the two buildings the windows were screened either with figurative stained glass or with molded plaster *transennae* with glass disks.<sup>69</sup> Possibly there was an initial phase in which only stucco screens were used, and subsequently stained glass was installed according to the western fashion in the most important areas of the church, such as the apses.

As for the nature of the glass material, we now know that the window glass of both the Pantokrator and the Chora reveals a durable soda-based composition that differs from the poorer-quality material generally used in Europe after the year 1000.<sup>70</sup> One could argue that the natron-based glass of the Pantokrator and the Chora was the result of recycling Roman glass. This, in fact, would be consistent with architectural practice during the Komnenian phase of the Pantokrator, when *spolia* were used on a large scale.<sup>71</sup> It also remains to be seen whether the chemical composition of the Komnenian mosaic tesserae at the Pantokrator is the same as or different from that of the glass used in the screens.<sup>72</sup> Common sense suggests that, because of the fragility of the material, the artisans would have favored the use of flat glass available in Constantinople, rather than of glass imported from abroad. Indeed, locally produced glass sheets were employed in the thirteenth century at the Crusader fortress of Montfort in the Holy Land, where stained glass was

66 Comparative chemical analyses are needed for the various disks, as well as comparisons with the glass used for mosaic tesserae.

67 The *grisaille* was obtained by mixing powdered glass with an acid—urine or vinegar—which was then applied with a brush and fixed by firing.

68 See Megaw, “Notes on Recent Work”; Lafond, “Découverte de vitraux historiés” (both n. 61 above); and the recent summary of the question in F. Dell’Acqua, “The Stained-Glass Windows from the Chora and the Pantokrator Monasteries: A Byzantine Mystery?” in *Restoring Byzantium: The Kariye Camii in Istanbul and the Byzantine Institute Restoration*, ed. H. Klein in collaboration with R. G. Ousterhout (New York, 2004): 68–77.

69 Some of the molded plaster screens remained in situ until modern times. A pictorial reproduction of one of them can be found in a wall painting in a passageway of the Chora architectural complex, as noted by Ousterhout, *Kariye Camii*, 89 and fig. 94 (n. 5 above).

70 For the most recent research, see R. H. Brill’s article in this volume.

71 Martin Harrison (*Temple for Byzantium*, 117 [n. 14 above]) thought that the window glass fragments of St. Polyuktos had been collected and recycled elsewhere, when the building was no longer in use. This hypothesis came from the observation that the quantity of flat glass found there appeared too limited when compared to the large size of the marble *transennae* in which it was originally set.

72 Many mosaic tesserae have been found amid the detritus of the church vaults, which were restored in the 18th century. My thanks to Robert G. Ousterhout for this and other precious information; see R. G. Ousterhout, Z. Ahunbay, and M. Ahunbay, “Study and Restoration of the Zeyrek Camii in Istanbul: First Report, 1997–98,” *DOP* 54 (2000): 265–69.

produced presumably in a workshop custom-built for that project, according to an established western tradition.<sup>73</sup>

The uniqueness of the stained glass from the Pantokrator and the Chora is also attested to by the technique used to make the glass sheets. Although they are generally described as cast, my own close examination reveals that they are for the most part cut from cylinder-blown sheets of glass.<sup>74</sup> Examples of cylinder-blown window glass dating later than the seventh century seem rare within the Byzantine world, where disks prevailed.

Another important element related to the finds from the Pantokrator and the Chora, and more broadly to the history of stained glass, is the introduction of lead comes. This development profoundly changed the manufacture of glazed windows for various reasons. It is still unclear when and whether lead comes were first adopted in western Europe or in the eastern Mediterranean.<sup>75</sup> Archaeologists have discovered lead-come-like objects at Sardis and Philippi, dating back to the sixth or seventh century, whereas the earliest western examples are dated to the late seventh or the early eighth century.<sup>76</sup>

Another feature appearing in the glass fragments from the Pantokrator and the Chora has no direct precedent in Byzantium: the use of fire-tempered painting. Some technical refinements of the painting appearing on these glasses cannot be found in the West before the ninth or tenth century, and are never found in the Eastern Mediterranean before thirteenth-century crusader examples. Although he took into account the degree of evolution of the grisaille in the fragments from the Pantokrator and the Chora, A. H. S. Megaw was induced by the archaism of some decorative patterns and the simplicity of the brush strokes to compare them all to western figurative stained glasses of the eleventh and the twelfth centuries, which were until a few years ago considered the “most ancient” Western stained glass (apart from the disk with Christ from Ravenna).<sup>77</sup> Megaw’s study concluded with the remark that these common features could validate the Byzantine origins of western stained glass.<sup>78</sup>

The painted decorative patterns on the finds at the Pantokrator and the Chora are too generic to allow for any kind of reliable comparison with western figurative stained glass. A careful checking remains to be done of the borders of western or crusader stained glass windows dating to the twelfth and thirteenth centuries to understand if the Constantinopolitan patterns belong to a decorative tradition developed within the area of glass manufacture, or if they represent an attempt to apply ornamental formulas that originated in other artistic media, since figurative stained glass was apparently outside the Byzantine artistic tradition.

76 The shape of the leading at Philippi is not the usual one for joining glass panels. Kourkoutidou-Nikolaïdou (“Vitraux paléochrétiens à Philippi,” 287–89 [n. 2 above]) writes that these lead comes were poured between glass panels: this presumes a hitherto unknown procedure. Possibly the Philippi lead strips were none other than lead from the roof. Dr. Kourkoutidou-Nikolaïdou mentions them to support Megaw’s hypothesis (“Notes on Recent Work,” 366 [n. 65 above]) of Byzantine origins for leaded window glass, and to

eliminate doubts concerning the precocious use of lead comes in the Byzantine area expressed by one of the rare scholars of Islamic transennae and “stained-glass,” H. G. Franz (“Window screens als Fensterverschluss,” *IstMitt* 8 [1958]: 65–81). My gratitude goes to Beat Brenk, who kindly furnished me with digital photographs of the glass and the leading of Philippi, exhibited in the archaeological museum of Thessalonike.

73 R. H. Brill, *Chemical Analyses of Early Glasses* (Corning, N.Y., 1999), 2:245 and 254–55. On this site, investigated on behalf of The Metropolitan Museum of New York, see the essay written by the then curator of arms and armor, who was interested in tracing Crusader remains: B. Dean, “A Crusaders’ Fortress in Palestine: A Report of Explorations Made by the Museum 1926,” *BMAA* (1927, part 2): 5–46, about window glass; see esp. 40ff. From some of the rooms in the castle of Montfort, various glass fragments survive with anthropomorphic and plant motifs painted with a dark grisaille comparable to contemporary Frankish and Rhenish examples.

74 See, for example, J. Henderson and M. M. Mango, “Glass at Medieval Constantinople: Preliminary Scientific Evidence,” in *Constantinople and Its Hinterland: Papers from the Twenty-seventh Spring Symposium of Byzantine Studies* (Oxford, April 1993), ed. C. Mango and G. Dagron (Aldershot, 1995), 333–56, esp. 346. I thank Susan Boyd, curator of the Byzantine Collection at Dumbarton Oaks, for having allowed my close examination of the fragments.

75 See D. Whitehouse, “Window-Glass between the First and the Eighth Centuries,” in *La vetrata in Occidente dal IV all’XI secolo, Atti delle giornate di studi, Lucca, Villa Bottini, 23–24–25 Settembre 1999: Il colore nel Medioevo; Arte Simbolo Tecnica*, ed. F. Dell’Acqua and R. Silva, Collana di studi sul colore 3 (Lucca, 2001), 31–43, esp. 38–39 for the leading. The earliest known example in the West comes from Jarrow in Northumbria (late 7th–early 8th c.), followed more than a century later by specimens from Saint-Denis, Rouen, Müstair, Farfa, and San Vincenzo al Volturno (9th c.).

77 For example, Megaw (“Notes on Recent Work,” 351, fig. G) had compared the panel painted with a human eye from the Pantokrator to other “eyes” from the stained-glass windows at Augsburg, Rheims, etc.

78 *Ibid.*, 359–62, 364, and 366.

The Kyriotissa church in Constantinople, later named Kalenderhane Camii, offers an interesting comparison for the glazed windows of the Pantokrator and of the Chora. Those who have investigated the archaeology of the Kyriotissa regretted the absence of evidence for window screens, although they thought that screens must have existed.<sup>79</sup> During a partial redecoration that occurred during the Latin occupation of Constantinople in the thirteenth century, the church was furnished with frescoes representing stories of St. Francis accompanied by Latin texts, and a series of Greek patriarchs, decidedly Byzantine in character, accompanied by Greek *tituli*. Greek letters were also found on some window glass from the Pantokrator and the Chora (figs. 15, 16).<sup>80</sup> The presence of Greek texts cannot prove or disprove the collaboration of Latin artists in the decorative program at Kyriotissa, and the same is true of the Greek *tituli* on some of the painted glass fragments from the Chora and the Pantokrator. Instead the presence of Greek *tituli* on a typically western artistic medium, like the stained glass of the Chora and of the Pantokrator, should be regarded as a symptom of convergence of two different artistic cultures or a response to the specific demands of the patrons. The paintings at Kyriotissa were certainly the product of a collaboration between local and western craftsmen (figs. 17, 18), and the stained glass in the Pantokrator and the Chora may have been produced in a similar manner.

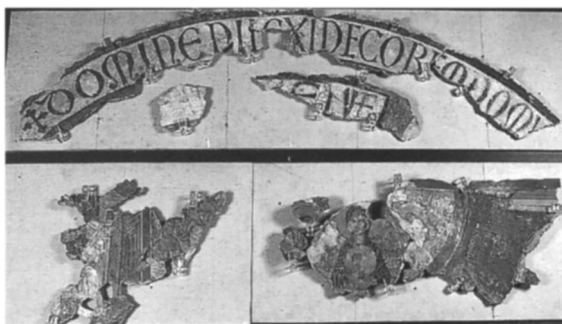
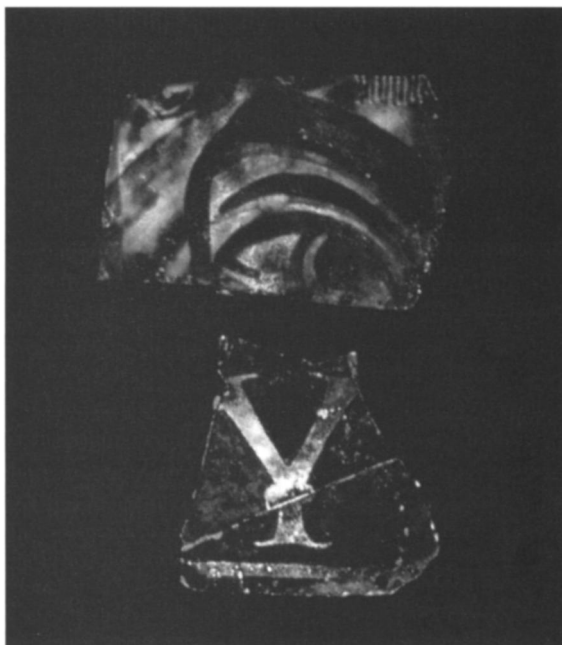
79 C. L. Striker and Y. Dogan Kuban, eds., *Kalenderhane in Istanbul: The Buildings, Their History, Architecture, and Decoration; Final Reports on the Archaeological Exploration and Restoration at Kalenderhane Camii 1966–78* (Mainz-am-Rhein, 1997), 70.

80 These letters were inscribed in dark grisaille, or obtained “by reserve,” that is, by incising the black background.

**Fig. 15** Fragments of glass painted with grisaille from Pantokrator (Zeyrek Camii). Istanbul, Archaeological Museum, 12th or 13th century? (photo courtesy of Dumbarton Oaks, Washington, D.C.)

**Fig. 16** Fragments of glass painted with grisaille from Chora or Kariye Camii. Dumbarton Oaks, Byzantine Collection, 12th or 13th century? (photo courtesy of Dumbarton Oaks, Washington, D.C.)

**Figs. 17–18** Fragments with *tituli* in Latin, frescoes from the Kyriotissa church (Kalenderhane Camii), Istanbul, Archaeological Museum, 13th century (photos courtesy Istanbul Archaeological Museum)



A cultural milieu favorable to this kind of interaction already existed before the Crusader occupation, during the reigns of John II Komnenos (1118–1143) and his direct descendants.<sup>81</sup> In fact Megaw had already favored a link between the presence of stained glass in the Chora and the patronage of the *sebastokrator* Isaac Komnenos.<sup>82</sup> Recently Robert Ousterhout has confirmed a Komnenian chronology for the stained glass of the Pantokrator, underlining the close links that this dynasty had with the West.<sup>83</sup> In any case, the experimental character of the introduction of figurative stained glass windows in the Pantokrator and the Chora must be stressed.<sup>84</sup>

In sum, I believe that the figurative stained glass from the Pantokrator and the Chora was made with sheets of glass that were cylinder blown in Constantinople, using natron-based recycled Roman glass, during the twelfth century. The figurative character of the glazed screens is certainly due to the participation of Western artisans, whose presence in Constantinople might have been favored by the alliances the Komnenian emperors had with Western powers and their domains in the Levant.<sup>85</sup> Figurative stained glass was displayed perhaps only in the most focal windows of the churches, whereas less prominent windows were screened by molded stucco screens with circular openings.

## Conclusions

The history of glass in the Byzantine empire has been barely studied, and therefore it has been described as a “mystery” or an “enigma” by prominent scholars such as Joseph Philippe and Gladys Davidson Weinberg.<sup>86</sup> To follow the developments and divergences of window screening in Byzantine architecture, it would be necessary to conduct an exhaustive review of all known window glass and of screens in various materials, starting from the flat glass discovered at sites dating from the sixth to ninth centuries and then continuing to the fifteenth century. Although I could not present a full survey here, my intention was to make at least a small offering to the study of the use of window glass in Byzantine architecture. I hope to have helped to illuminate “the dark side of the Moon,” as Enrico Castelnuovo defined the history of stained glass in the eastern Mediterranean a few years ago.<sup>87</sup>

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This essay is dedicated to Beat Brenk, to wish him “luminosi anni romani.” I wish to thank Alice-Mary Talbot, Director of Byzantine Studies at Dumbarton Oaks, which gave me a Summer Fellowship to prepare my work for the excavations at Amorium (Turkey), as well as Christopher S. Lightfoot (The Metropolitan Museum of Art), the director of the excavations at Amorium, and his deputy Eric A. Ivison (College of Staten Island, N.Y.), who invited me to study the flat glass and the remains of stucco screens during the summer of 2002. While I was at Dumbarton Oaks, I profited from the generous collaboration of Susan Boyd and Natalia Teteriatnikov, and from the presence of Slobodan Ćurčić (Princeton University) and Evangelia Hadjistryphonos (European Center of Byzantine and Post-Byzantine Monuments, Thessalonike). My visit to Sardis the previous year proved to be very useful, because I had the opportunity of viewing the glass sherds found there, thanks to the help of Andrew Ramage and the director of the excavations Peter H. Greenewalt (University of California at Berkeley). A meeting with Robert G. Ousterhout (University of Illinois, Urbana-Champaign) at the Zeyrek Camii in Istanbul was also very valuable for elucidating various scientific points. Last but not least, I wish to express

81 The influence of Komnenian patronage on the urban and architectural development of the city is demonstrated by P. Magdalino, *Constantinople médiévale: Études sur l'évolution des structures urbaines*, Travaux et mémoires du Centre de Recherche d'Histoire et Civilisation de Byzance, Collège de France, Monographies 9 (Paris, 1996), 69–76.

82 “Notes on Recent Work,” 367.

83 *Master Builders*, 154 (n. 4 above).

84 This character, in my opinion, is matched in the case of the Pantokrator, with its unconventional, composite church plan, which is neither centralized nor longitudinal. Also, its *opus sectile* floor goes beyond standard Byzantine formulas, bearing some similarities to work by the famous Italian Cosmati.

85 Cf. Dell'Acqua, “Stained-Glass Windows,” 73 (n. 68 above).

86 Philippe, *Monde byzantin*, 4 (n. 65 above); about the window-glazing, 18; idem, *La verrerie des pays byzantins*, Corsi di cultura ravennate e bizantina (Ravenna, 1966); idem, “Sur la question byzantine en matière de verrerie et de cristal de roche,” in *Kunst im Zeitalter der Kaiserin Theophanu: Akten des Internationalen Colloquiums veranstaltet vom Schnütgen-Museum, Köln, Juni 1991*, ed. G. Sporbeck (Cologne, 1993), 49–57. G. Davidson Weinberg, “A Medieval Mystery: Byzantine Glass Production,” *JGS* 17 (1975): 127–41; more recently M. M. Mango (in Henderson and Mango, “Glass at Medieval Constantinople,” 333 [n. 74 above]) has pointed out that “in scholarly terms, Byzantine glass lacks an established identity.”

87 F. Dell'Acqua and D. Whitehouse, “Tavola Rotonda,” in *La vetrata in Occidente dal IV all'XI secolo*, 286–87.

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